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09/327,347	06/05/1999	JAMALODDIN S. GOLESTANI	GOLESTANI.3	5312

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EXAMINER
LE, HIEU C

ART UNIT	PAPER NUMBER
2153	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/327,347	Applicant(s) GOLESTANI, JAMALODDIN S.
	Examiner Hieu c. Le	Art Unit 2153

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,12,14,-15,,21,23,25-27,31,34* is/are rejected.

7)☒ Claim(s) *9-11,13,16-20,22,24,28,29,33,35 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Response to Arguments

1. The Amendment file 3/19/02 have been entered and made of record.

2. The Applicant's argument filed 3/19/02 have been fully considered but they are not persuasive for the following reasons:

As to claim 1, Applicant alleges that "Afek is link centric [,]" (p. 4, lines 6-25). The Applicant argument is not persuasive. Firstly, Afek is a session centric flow control system that regulates the sessions flow rate (Abstract, col. 8, lines 7-13). Secondly, MACR (Maximum allowable cell rate) is a measure of sessions rate and is used to control sessions rate (col. 8, lines 17-34).

Applicant alleges that "Third, the second step of claim 1 [,]" (p. 4, line 31-p.5, line 2). MACR (Maximum allowable cell rate) is a measure of sessions rate and is used to control sessions rate (col. 8, lines 17-34). The Applicant argument is not persuasive. MACR (Maximum allowable cell rate) is related to flow rate of the session as shown above (col. 8, lines 7-14). Applicant alleges that "Rather, the cited text basically [,]" (p. 5, lines 8-21). Applicant argument is not persuasive. The algorithm of Afek reduces the rate of sessions (cost function assigned to sessions) by the unused link capacity Δ (congestion cost functions assigned to links) (col. 6, lines 25-41).

As to claim 5, Applicant alleges that "Since claim 5 requires both [,]" (p. 5, line 30-p. 6- Applicant alleges that " It remains, therefore, that Afek [,]" (p. 6, lines 15-16). line 16). The

Applicant argument is not persuasive. Afek discloses the use of two factors, the second factor is a weighted average of Δ (session congestion measure) to compute a new rate (col. 10, lines 9-11).

Applicant alleges that " It remains, therefore, that Afek [,]" (p. 6, lines 15-16). The Applicant argument is not persuasive. Afek computes new rates by reducing the session rates that are above Δ by the amount of the unused bandwidth on the link (col. 6, lines 24-35). The value of Δ is computed by counting the number of cells arriving over an interval of time, subtracting this amount from the number of cells that could be transmitted in that interval dividing by the length of time (i.e rate) (col. 6, lines 34-47). The session are restricted by multiple of Δ (col. 6, lines 64-67).

As to claim 6, Applicant alleges that "no artisan would assert that a router of a network is a (receiving end) [,]" (p. 6, line 22-p. 7-line 5). Firstly, there is nothing in the claim that defines the receiving end other than a router. Secondly, Applicant's specification discloses a switch (routers) to receive the packets and increment the congestion field (p. 12, line 28-p. 13, line 13). Thirdly, Afek is computing a new session rate as explained above (col. 6, lines 34-47).

As to claim 8, Applicant alleges that " the Examiner asserts [,]" (p. 7, lines 8-23). The Applicant argument is not persuasive. Firstly, it is clear that Δ is a rate (the number of cells divided by period of time) as explained above (col. 6, lines 34-47) and is used to constrain the rates of sessions by a multiple of Δ (i.e additive factor of increment change) (col. 6, lines 57-67).

As to claim 25, Applicant alleges that " claim 25 specifics this condition [,]" (p. 7, line 24-p. 8, line 3). The Applicant argument is not persuasive. Firstly, the Examiner can not find this feature in the claim language, more specifically, claim 25 does not specify that the packets of a session are split into two sets. Secondly, col. 10, lines 63-65 reads on claim 25 because it discloses that the router sends a backward packet (probe packet) to the source indicating ER (explicit rate indication) (congestion indication).

As to claim 23, Applicant has amended the claim by adding the new limitation, first and second mutually exclusive subsets, arguments are moot in view of new grounds of rejection.

As to claim 34, Applicant alleges that " applicant respectfully disagrees [,]" (p. 8, line 23-p. 9, line 7). The Applicant argument is not persuasive. Firstly, Afek discloses that the value of the ER field in RM cells is equated to MACR (col. 9, lines 56-57, col. 11, lines 5-11). Secondly, the MACR is a session congestion measure and is used to constrain session rate as explained above. Thirdly, Afek clearly states " all sessions that are restricted to this link are allowed to get a rate equal to MACR" (col. 9, lines 56-57) i.e MACR is a session rate.

As to claim 2, Applicant alleges that " therefore, incorporating the teachings [,]" (p. 9, line 28-p. 10, line 7). The Applicant argument is not persuasive. Firstly, eq-n 15 a gradient of the subnetwork revenue with respect to the capacity of the link which is indeed a cost function or a "session incremental reward function". Secondly, Afek discloses that the flow control algorithm to regulate traffic and maximize bandwidth allocation (col. 7, lines 51-54) and Mitra discloses

optimizing bandwidth by determining traffic rate to be offered and the allocations of bandwidth to respective links (abstract, col. 7, lines 62-66) which are analogous are.

As to claim 3, Applicant alleges that " the sensitivity measure of equation 3 [,]" (p. 10, lines 8-15). The Applicant argument is not persuasive. The capacity cost of the link as shown in eq-n 3 are congestion cost functions of links.

As to claim 4, Applicant alleges that " the Examiner points to col. 6, lines 38-39 [,]" (p. 10, lines 16-30). The Applicant argument is not persuasive. Mitra discloses that the link capacities may become so great (col. 6, lines 38-39) and a threshold is used to limit the upper bound of the link capacity increment (col. 12, lines 24-27).

As to claim 35, Applicant alleges that " the text in col 7, states [,]" (p. 10, line 31-p. 11, line 9). The Applicant argument is not persuasive. The text states that the link loss probabilities are estimated (col. 11, lines 53-55) and when packets are lost on a link, the loss is experienced at the destination (receiving end) which receives the sent packets less than the lost ones.

As to claims 14,12,15 Applicant alleges that "Fig. 3 which the Examiner [,]" (p. 11, lines 14-26). The Applicant argument is not persuasive. Firstly, Fig. 3 represents the relation of traffic flow and revenue (i.e session incremental reward function). Secondly, the Examiner can not find the limitation "a link cost function that is used in the control of traffic rates by a source" in the claim language of the rejected claims.

Claim Rejections - 35 U.S.C. § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 5-8,25-27, 31-32 &34 are rejected under 35 U.S.C. 102(b) as anticipated by Afek et al (US.Pat.No.5,748,901).

As to claim 1, Afek discloses in a network that carries traffic of a plurality of sessions, a method, carried out by one of said sessions, comprising the steps of:

evaluating a session congestion measure that is related to congestion information on links of said network which carry incoming traffic to a receiving end of said session [a TCP/IP header includes a selective set of explicit forward congestion indication bit (col. 11, lines 6-10)];

evaluating a session incremental reward function that is related to rate of said incoming traffic [Fair share parameter (MACR) is computed for each session (col. 7; lines 63-65) which is related the flow rate of the session (col. 8, lines 7-14)].

evaluating a new rate of said incoming traffic that moves said rate of said to incoming traffic in a direction that minimizes a global network cost function which combines cost functions assigned to said sessions and congestion cost functions assigned to said links [new flow rates are calculate to minimize the changes in MACR (cost functions assigned to said sessions) and changes in link utilization (congestion cost functions assigned to links) (col. 8, line 25-col. 9, lines 19)].

As to claim 5, Afek further discloses where said new rate is an incremental change from said rate of said incoming traffic of said session, where the incrementing is determined based on said session incremental reward function and said session congestion measure [the change in the rate of flow of traffic is updated in increments of Δ (col. 10, lines 7-45)].

As to claim 6, Afek further discloses where said step of evaluating a new rate is carried out at a receiving end of said session, and said method further comprises a step of communicating information to a sending end of said session, to change said rate of said incoming traffic towards said new rate [the evaluation of the new rate of flow is carried in router (receiving end) and the source (sending end) periodically polls the router (receiving end) to receive the new rate and adjust it's window (col. 10, line 46-54)].

As to claim 7, Afek further discloses where said step of evaluating a new rate is carried out at a sending end of said session and includes a step of receiving at said sending end results of said step of evaluating said session congestion measure [the new rate is implemented in the source (sending end) after it receives a backward packet with a TCP/IP header includes the current rate and the source adjust it's window size (col. 10, lines 55-65)].

As to claim 8, Afek further discloses where said new rate developed is an incremental change arrived at through an additive factor [the new rate is an average of Δ i.e (incremental change of additive factor) (col. 10, lines 9-10)].

As to claim 25, Afek further discloses where said incoming traffic originates at a

sending end, and said sending end includes in said incoming traffic probe packets that include at least one congestion field that is modified by network nodes through which said probe packets traverse [the router sends a backward packet (probe packet) to the source (col. 10, lines 63-65). The packet includes a Explicit Forward Congestion indication bit (ones congestion field) (col. 11, lines 6-11)].

As to claim 26, Afek further discloses where said probe packets are transmitted by to said sending end at regular intervals [the packets are sent periodically by the router (col. 10, lines 48-54)].

As to claim 27, Afek further discloses where said probe packets also carry information for said receiving end [the backward packets (probe packets) indicate the current rate to the source (receiving end of the packet) (col. 10, lines 55-59)].

As to claim 31, Afek further discloses where information received at said receiving end of said session from said second one of said congestion fields is employed to control said rate of said incoming traffic (col. 11, lines 6-15).

As to claim 32, Afek further discloses where said step of evaluating said session congestion measure employs information contained in said at least one congestion field of probe packets received in said incoming traffic and in said second one of said congestion fields (col. 10, lines 66-col. 11, line 10)

As to claim 34, Afek further discloses where said step of evaluating said session congestion measure equates said session congestion measure to the value of said at least one congestion field of a received probe packet (col. 9, lines 56-57, & col. 11, lines 37-42).

Claim Rejections - 35 U.S.C. § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-4,21,23, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Afek et al (US.Pat.No.5,748,901), as applied to claim 1 above, and further in view of Mitra et al (US.Pat.No. 6,331,986).

As to claim 2, Afek does not discloses where said session incremental reward function is the negative of a derivative, with respect to rate of said incoming traffic, of said one of said cost functions assigned to said session.

Mitra discloses a method for optimizing routing and bandwidth allocation in a network by determining a traffic rate to be offered to each of permissible routes between a source and destination (Abstract). A revenue sensitivity to link capacity (a session incremental reward function) is calculated with respect to as shown in col. 17, equation 15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mitra's teachings to modify Afek's method by using a negative derivative session incremental reward function of the incoming traffic rate [in order to allocate a respective bandwidth to each link and determine the traffic rate to be offered.

As to claim 3, Afek does not disclose where said session congestion measure is a derivative, with respect to said rate of said incoming traffic, of a sum of congestion cost functions assigned to links employed by said session.

Mitra discloses a method for optimizing routing and bandwidth allocation in a network by determining a traffic rate to be offered to each of permissible routes between a source and destination (Abstract). A network implied cost (a session congestion measure) that implies the cost for the traffic routing based on capacity costs the function is a derivative and is the sum of the capacity costs (congestion costs) of the link as shown in col. 15, equation 3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mitra's teachings to modify Afek's method by using a derivative session congestion measure of the sum of congestion cost functions of the links in order to allocate a respective bandwidth to each link and determine the traffic rate to be offered.

As to claim 4, Afek does not disclose where said congestion cost function assigned to a link is very large for link loads in excess of a selected threshold, chosen as maximum permissible link load.

Mitra discloses a method for optimizing routing and bandwidth allocation in a network by determining a traffic rate to be offered to each of permissible routes between a source and destination (Abstract). Mitra discloses that the implied costs (congestion cost function) reflect the effective lost of revenue associated with carrying calls (sessions) on a given link reduces the remaining capacity of the link (col. 6, lines 35-42). The link capacities may become so great (col. 6, lines 38-39). A threshold is used to limit the upper bound of the link capacity increment (col. 12, lines 24-27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mitra's teachings to modify Afek's method by using a threshold to limit the upper bound of loads on a link when the congestion cost function assigned to link is very larger in order to allocate a respective bandwidth to each link and determine the traffic rate to be offered.

As to claim 21, Afek does not disclose where said incoming traffic comprises packets, and all packets of said incoming traffic of said session traverse the same path that includes a given subset of links of said network.

Mitra discloses a method for optimizing routing and bandwidth allocation in a network by determining a traffic rate to be offered to each of permissible routes between a source and destination (Abstract). The incoming traffic traverse the same path that includes a given subset of links in the network (col. 7, lines 42-60, Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mitra's teachings to modify Afek's method by using a network where all the

incoming traffic of the session traverse the same path in order to allocate a respective bandwidth to each link and determine the traffic rate to be offered.

As to claim 23, Afek does not disclose where said incoming traffic comprises packets where a subset of said packets traverse a first subset of links of said network, remaining packets of said incoming traffic traverse a second subset of links and said first subset and second subset are mutually exclusive.

Mitra discloses a method for optimizing routing and bandwidth allocation in a network by determining a traffic rate to be offered to each of permissible routes between a source and destination (Abstract). The network supports plural subnetworks. Allocating respective bandwidth to each link of each subnetwork which is performed in a mutually responsive manner (abstract, Fig. 1). A router r routes each stream to a set of permissible routes for the stream (col. 8, lines 12-17).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mitra's teachings to modify Afek's method by routing the packets traverse a first and second mutually exclusive subsets of links in order to allocate a respective bandwidth to each link and determine the traffic rate to be offered.

As to claim 35, Afek does not disclose where said step of evaluating said session congestion measure is based on probability of packet loss experienced at said receiving end.

Mitra discloses a method for optimizing routing and bandwidth allocation in a network by determining a traffic rate to be offered to each of permissible routes between a source and

destination (Abstract). Calculating the link loss probabilities (col. 7, lines 30-32, col. 11, lines 53-55).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mitra's teachings to modify Afek's method by calculating the loss probabilities of the link in order to allocate a respective bandwidth to each link and determine the traffic rate to be offered.

7. Claims 12, 14 -15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Afek et al (US.Pat.No.5,748,901), as applied to claim 1 above, and further in view of Szentesi (US.Pat.No. 5,844,886).

As to claims 12, 14-15, Afek does not disclose where said session incremental reward function 5 is a positive, decreasing, function with respect to session rate, and where a derivative of each of said link cost functions is a positive, increasing function with respect to rate of traffic on the link.

Szentesi discloses an efficient method for management of traffic overloads on a network. As shown in Fig. 3, the session incremental reward function (the curve represents the relation of traffic flow and revenue) is a positive decreasing function. As shown in fig. 9, the link cost function (the curve represent the represents the relation of optimal load (or traffic volume) and revenue is a positive increasing function).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Mitra's teachings to modify Afek's method by using a positive decreasing session

incremental reward function and a positive increasing link cost function in order to provide additional revenue gains over conventional traffic management method.

Allowable Subject Matter

8. Claims 9- 11, 13, 16-20, 22, 24, 28-30, 33, 35-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hieu Le whose telephone number is (703) 306-3101. The examiner can normally be reached on Monday to Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenton Burgess, can be reached on (703) 305-4752. The fax phone number for this Group is (703) 308-9051.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Hieu Le

Dung C. Dinh
Primary Examiner